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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/034,761	12/27/2001	Ioannis Pavlidis	H0002442-03	1894

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EXAMINER
LAVIN, CHRISTOPHER L

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/034,761	PAVLIDIS ET AL.	
	Examiner	Art Unit	
	Christopher L. Lavin	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-17 and 19-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-17 and 19-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 May 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

This action is in response to the amendment filed on 06/05/06.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1 – 8, 10 – 17, 19 – 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Grimson et al ("Using adaptive tracking to classify and monitor activities in a site", Proceedings 1998 IEEE Conference on Computer Vision and Pattern recognition, Santa Barbara, CA, 1998 June 23 – 25; pages 22 – 29) and Stein ("Tracking from multiple view points: Self-calibration of space and time", Computer Vision and Pattern Recognition, 1999, IEEE Computer Society Conference on, Volume 1, 23-25 June 1999 Page(s): 521 – 527).

In regards to claim 11, Grimson discloses A system for use in monitoring a search area, the system comprising: a plurality of imaging devices positioned to cover a defined search area, wherein each field of view of each imaging device comprises a field of view portion which overlaps with at least one other field of view of another imaging device (Section 3); and a computer apparatus operable to (Figures 1 – 8, p. 24 first three paragraphs under section 3: For a system to perform the operations described in this article including creating the images shown through the figures that system must include a computer.): fuse image data from the plurality of imaging devices into a single image, wherein a plurality of [physically marked landmark points] of commonality in field of view portions which overlap is used to fuse image data (Section 3, Grimson finds homography transform matrices based on moving objects.); segment foreground information of the fused image from background information of the fused image data (p. 23, second full paragraph in the right column); use the foreground information to provide object path data representative of at least one object path of one or more moving objects in the search area (p. 23, last three paragraphs: The object path

is recorded as location, speed and direction.); recognize one or more defined normal and/or abnormal object path feature models based on one or more characteristics associated with normal, i.e., common activity, or abnormal, i.e., unusual events, object paths of moving objects (p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2); and compare the object path data to the one or more defined normal and/or abnormal object path feature models for use in determining whether the at least one object path is normal or abnormal (p. 26, first two paragraphs under section 5.2).

Grimson teaches of tracking multiple objects in a "composite image" created using homography transform matrices. These matrices are created by tracking moving objects in the video streams. Grimson does not teach that a homography matrix should be created from the non-moving, i.e., static, objects in the video streams.

Stein discloses an improvement to the system disclosed by Grimson, by first finding (Sections 1.1 and 3.3) a course homography matrix by tracking moving objects just as Grimson discloses. Stein notes, "the initial alignment does not perfectly align the ground plane". Stein then refines the alignment by finding a homography transform matrix in using the static features of the video streams.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use the refined homography transform approach disclosed by Stein in the method taught by Grimson. The combination would allow for a more accurate alignment of the video streams. Thus more accurate information would be obtained from the composite video stream.

In regards to claim 12, The system of claim 11, wherein at least one of the one or more characteristics associated with normal or abnormal object paths comprises the trajectory thereof (p. 23, last three paragraphs: Trajectory is defined by location, speed and direction.).

In regards to claim 13, The system of claim 11, wherein the one or more defined normal and/or abnormal object path feature models comprise one or more defined normal object path feature models based on one or more characteristics associated with normal object paths, wherein the computer apparatus is further operable to compare the object path data to the one or more defined normal object path feature models to determine whether the at least one object path is normal, and further wherein the system comprises an alarm device operable to provide an alarm if the at least one object path is not normal (p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2: "Mark[ing] for investigation": is a way of alarming a user to the fact that an object path is not normal.).

In regards to claim 14, The system of claim 11, wherein the one or more defined normal and/or abnormal object path feature models comprise one or more defined threatening, i.e., unusual, and/or non-threatening, i.e., common, object path feature models based on one or more characteristics associated with threatening object paths, and further wherein the computer apparatus is operable to compare object path data to the one or more defined threatening and/or non-threatening object path feature models for use in determining whether the at least one object path indicates occurrence of a

threatening event (p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2).

In regards to claim 15, The system of claim 14, wherein the computer apparatus is further operable to: provide object path data representative of a plurality of object paths corresponding to a plurality of moving objects in the search area over a period of time (Figure 2); group the plurality of object paths into one or more clusters based on the commonality of one or more characteristics thereof (Figure6, bottom left; p. 27, second and third full paragraphs); and identify the one or more clusters as normal object path clusters comprising a plurality of object paths representative of normal object paths of moving objects in the search area or clusters comprising a single object path or a smaller number of object paths relative to the number of object paths in the normal object path clusters (p. 28, second full paragraph: By placing clusters into a hierarchy common, or normal, object paths are identified.).

In regards to claim 16, The system of claim 15, wherein the computer apparatus is further operable to use the object path data representative of an object path in a cluster comprising a single object path or a cluster comprising a smaller number of object paths relative to the number of object paths in the normal object path clusters to define one or more defined normal and/or abnormal object path feature models (p. 28, second full paragraph; p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2).

In regards to claim 17, The system of claim 15, wherein the computer apparatus further is operable to identify the one or more clusters as non-threatening object path

clusters comprising a plurality of object paths representative of non-threatening object paths of moving objects in the search area or clusters comprising a single object path or a smaller number of object paths relative to the number of object paths in the non-threatening object path clusters, and further wherein the computer apparatus is operable to determine whether any of the clusters comprising single object paths or the smaller number of object paths relative to the number of object paths in the non-threatening object path clusters are to be used to define one or more defined threatening and/or non-threatening object path feature models for use in determining whether an object path indicates occurrence of a threatening event (p. 28, second full paragraph; p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2).

In regards to claim 19, The system of claim 11, wherein the computer apparatus is operable to recognize at least one object path tracked in the search area and calculate one or more features associated with the at least one object path (p. 23, final paragraph).

In regards to claims 1 – 7 and 10, claims 1 – 7 and 10 are rejected for the same reasons as claims 11 – 17 and 19. The argument analogous to that presented above for claims 11 – 17 and 19, is applicable to claims 1 – 7 and 10.

In regards to claim 20, claim 20 is rejected for the same reasons as claim 15. The argument analogous to that presented above for claim 15 is applicable to claim 20.

In regards to claim 21 – 23, claims 21 – 23 are rejected for the same reasons as claim 17. The argument analogous to that presented above for claim 17 is applicable to claims 21 – 23.

In regards to claim 25, A system for use in monitoring a moving object in a search area, wherein the system comprises: a plurality of imaging devices positioned to provide image data covering a defined search area, wherein each field of view of each imaging device comprises a field of view portion which overlaps with at least one other field of view of another imaging device (p. 24, first three paragraphs under section 3); means for fusing all the image data from the plurality of imaging devices into a single image using a plurality of [physically marked landmark points] of commonality in field of view portions which overlap (p. 24, final paragraph); means for segmenting foreground information of the fused image data from background information of the fused image data (p. 23, second full paragraph in the right column); means for using the foreground information to provide object path data representative of at least one object path of one or more moving objects in the search area (p. 23, second full paragraph in the right column); means for recognizing one or more defined non-threatening and/or threatening object path feature models based on one or more characteristics associated with non-threatening and/or threatening object paths of moving objects in the search area (p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2); and means for comparing the object path data to the one or more defined non-threatening and/or threatening object path feature models for use in determining whether the at

least one object path is indicative of a threatening event (p. 26, first paragraph under section 5.1 and first two paragraphs under section 5.2).

Grimson teaches of tracking multiple objects in a "composite image" created using homography transform matrices. These matrices are created by tracking moving objects in the video streams. Grimson does not teach that a homography matrix should be created from the non-moving, i.e., static, objects in the video streams.

Stein discloses an improvement to the system disclosed by Grimson, by first finding (Sections 1.1 and 3.3) a course homography matrix by tracking moving objects just as Grimson discloses. Stein notes, "the initial alignment does not perfectly align the ground plane". Stein then refines the alignment by finding a homography transform matrix in using the static features of the video streams.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to use the refined homography transform approach disclosed by Stein in the method taught by Grimson. The combination would allow for a more accurate alignment of the video streams. Thus more accurate information would be obtained from the composite video stream.

In regards to claim 24, claim 24 is rejected for the same reasons as claim 25. The argument analogous to that presented above for claim 25 is applicable to claim 24.

Response to Arguments

1. Applicant's arguments filed 06/05/06 have been fully considered but they are not persuasive.

2. The applicant first agues "the references cited do not show such selection and physical marking". The examiner would like to point out that the applicant is entitled to the broadest possible interpretation of the language and thus physical marking can be read as any operation used to identify non-moving points of commonality between images. Stein discloses that static features are used to form a homography matrix. Thus Stein discloses physically marking non-moving points of commonality.

3. The applicant's primary argument centers on the Irani document supplied by the applicant. Although at first blush the applicant's arguments appear to be valid with regards to Irani upon closer inspection it is clear that Irani does in fact relay on static features and not motion information. Irani is addressing a problem called Ego-motion although it would probably be better understood if it were called camera shaking. Essentially when a user is holding a video camera, the users hands will shake slightly leading to a jittery picture. Irani is trying to use software to correct for this jittering by warping the pictures together so the image is smooth. Throughout the article when motion is being talked about it is the motion of the camera itself and not the motion of the scene. First paragraph of the introduction "The motion observed in an image sequence can be caused by camera motion (ego-motion) and by motion of objects moving in the scene. <u>In this paper we address the case of the camera moving in a static scene.</u>"

Stein obviously is not dealing with the same situation (a single handheld camera). However, after the initial alignment Stein's warped images are rather close to what one would expect from ego-motion between frames of video. So Stein's

descriptions of the operation are correct. "Given the rough alignment we can use robust estimation techniques on the static features to determine a more accurate alignment of the ground plane". And, "the general idea is to search for a homography matrix A2 that minimizes the 'sum square difference' between image 1 and the warped image 2". So to summarize, Irani shows that Stein is using static features to find the difference (using homography) between image 1 and warped image 2, this difference is used to refine the alignment.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher L. Lavin whose telephone number is 571-272-7392. The examiner can normally be reached on M - F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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